

**Department of Higher Education**  
**University of Computer Studies, Hinthada**  
**Fifth Year ( B.C.Sc./B.C.Tech.)**  
**English**  
**Mid-Term Examination**  
**March, 2018**

**Answer All questions.**

**Time allowed: 3 Hours**

**QUESTION I**

**(20 Marks)**

Read the following passage and answer Questions 1-10.

- A. One of the most captivating natural events of the year in many areas throughout North America is the turning of the leaves in the fall. The colours are magnificent, but the question of exactly why some trees turn yellow or orange, and others red or purple, is something which has long puzzled scientists.
- B. Summer leaves are green because they are full of chlorophyll, the molecule that captures sunlight and converts that energy into new building materials for the tree. As fall approaches in the northern hemisphere, the amount of solar energy available declines considerably. For many trees - evergreen conifers being an exception - the best strategy is to abandon photosynthesis \* until the spring. So rather than maintaining the now redundant leaves throughout the winter, the tree saves its precious resources and discards them. But before letting its leaves go, the tree dismantles their chlorophyll molecules and ships their valuable nitrogen back into the twigs. As chlorophyll is depleted, other colours that have been dominated by it throughout the summer begin to be revealed. This unmasking explains the autumn colours of yellow and orange, but not the brilliant reds and purples of trees such as the maple or sumac.
- C. The source of the red is widely known: it is created by anthocyanins, water-soluble plant pigments reflecting the red to blue range of the visible spectrum. They belong to a class of sugar-based chemical compounds also known as flavonoids. What's puzzling is that anthocyanins are actually newly minted, made in the leaves at the same time as the tree is preparing to drop them. But it is hard to make sense of the manufacture of anthocyanins - why should a tree bother making new chemicals in its leaves when it's already scrambling to withdraw and preserve the ones already there?
- D. Some theories about anthocyanins have argued that they might act as a chemical defence against attacks by insects or fungi, or that they might attract fruit-eating birds or increase a leaf's tolerance to freezing. However there are problems with each of these theories, including the fact that leaves are red for such a relatively short period that the expense of energy needed to manufacture the anthocyanins would outweigh any anti-fungal or anti-herbivore activity achieved.
- E. It has also been proposed that trees may produce vivid red colours to convince herbivorous insects that they are healthy and robust and would be easily able to mount chemical defences against infestation. If insects paid attention to such advertisements, they might be prompted to lay their eggs on a duller, and presumably less resistant host. The flaw in this theory lies in the lack of proof to support it. No one has as yet ascertained whether more robust trees sport the brightest leaves, or whether insects make choices according to colour intensity.
- F. Perhaps the most plausible suggestion as to why leaves would go to the trouble of making anthocyanins when they're busy packing up for the winter is the theory known as the 'light screen' hypothesis. It sounds paradoxical, because the idea behind this hypothesis is that the red pigment is made in autumn leaves to protect chlorophyll, the light-absorbing chemical, from *too much light*. Why does chlorophyll need protection when it is the natural world's supreme light absorber? Why protect chlorophyll at a time when the tree is breaking it down to salvage as much of it as possible?
- G. Chlorophyll, although exquisitely evolved to capture the energy of sunlight, can sometimes be overwhelmed by it, especially in situations of drought, low temperatures, or nutrient deficiency. Moreover, the problem of oversensitivity to light is even more acute in the fall, when the leaf is busy preparing for winter by dismantling its internal machinery. The energy absorbed by the chlorophyll molecules of the unstable autumn leaf is not immediately channelled into useful products and processes, as it would be in an intact summer leaf. The weakened fall leaf then becomes vulnerable to the highly destructive effects of the oxygen created by the excited chlorophyll molecules.

- H. Even if you had never suspected that this is what was going on when leaves turn red, there are clues out there. One is straightforward: on many trees, the leaves that are the reddest are those on the side of the tree which gets most sun. Not only that, but the red is brighter on the upper side of the leaf. It has also been recognised for decades that the best conditions for intense red colours are dry, sunny days and cool nights, conditions that nicely match those that make leaves susceptible to excess light. And finally, trees such as maples usually get much redder the more north you travel in the northern hemisphere. It's colder there, they're more stressed, their chlorophyll is more sensitive and it needs more sunblock.
- I. What is still not fully understood, however, is why some trees resort to producing red pigments while others don't bother, and simply reveal their orange or yellow hues. Do these trees have other means at their disposal to prevent overexposure to light in autumn? Their story, though not as spectacular to the eye, will surely turn out to be as subtle and as complex.

Questions 1-3: Do the following statements agree with the information in the reading passage?

- TRUE**                    *if the statement agrees with the information*  
**FALSE**                    *if the statement contradicts the information*  
**NOT GIVEN**            *if there is no information on this*

1. It is likely that the red pigments help to protect the leaf from freezing temperatures.
2. The 'light screen' hypothesis would initially seem to contradict what is known about chlorophyll.
3. Leaves which turn colours other than red are more likely to be damaged by sunlight.

Questions 4-7: Complete the sentences below. Choose ONE WORD ONLY from the passage for each answer.

4. The most vividly coloured red leaves are found on the side of the tree facing the \_\_\_\_\_.
5. The \_\_\_\_\_ surfaces of leaves contain the most red pigment.
6. Red leaves are most abundant when daytime weather conditions are \_\_\_\_\_ and sunny.
7. The intensity of the red colour of leaves increases as you go further \_\_\_\_\_.

Questions 8-10: Which paragraph contains the following information?

8. a description of the substance responsible for the red colouration of leaves
9. the reason why trees drop their leaves in autumn
10. some evidence to confirm a theory about the purpose of the red leaves

## QUESTION II

(20 Marks)

II. (A) Change the following sentences into correct tense by using the words given in the brackets.

1. It (expect) that the President will resign due to the recent revelations.
2. A cinema is a place where films (show).
3. We were driving along quite fast but we (overtake) by lots of other cars.
4. In the United states, elections for President (hold) every four years.
5. The boat sank quickly but fortunately everybody (rescue).
6. While I was on holiday, my camera (steal) from my hotel room.
7. Originally the book (write) in Spanish and a few years ago it was translated into English.
8. Most of the earth's surface (cover) by water.
9. The situation is serious. Something must (do) before it's too late.
10. It's not certain how the fire started but it might (cause) by an electrical fault.

II. (B) Make sentences from the words in brackets. Sometimes the verb is active, sometimes passive.

1. A tree was lying across the road. (it/ blow down/ in the storm).
2. My car has disappeared. (it / steal)
3. The police have found the people they were looking for. (two people / arrest / last night).
4. The man next door disappeared six months ago. (nobody / see / since then).
5. Tom gets a higher salary now. ( he / promote )

### QUESTION III

(20 Marks)

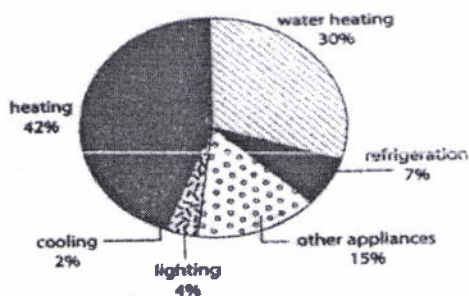
III. (A). Rewrite the sentences in such a way which mean exactly the same as the sentence that is given.

1. The number of air travellers fluctuated remarkably.  
There was -----.
2. Sales of convenience food increased steeply.  
There was -----.
3. There was a gradual decline in sugar imports.  
Sugar imports -----.
4. There was a sudden decrease in the sale of mangoes.  
The sale of mangoes -----.
5. There has been a dramatic rise in the production of films.  
The production of films -----.

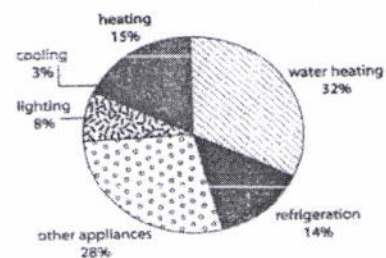
III. (B) You should spend about 20 minutes on this task.

*The first chart below shows how energy is used in an average Australian household. The second chart shows the greenhouse gas emissions which result from this energy use. Summarise the information by selecting and reporting the main features, and make comparisons where relevant.*

**Australian household energy use**



**Australian household greenhouse gas emissions**



### QUESTION IV

(20 Marks)

IV. (A) Describe a person who has done a lot of work to help people. You should say

- *who this person is / was*
- *where this person lives / lived*
- *what he / she has done to help people*

And explain how you know about this person.

IV. (B) Answer these questions about yourself.

1. Do you agree, Reading is one of the best ways of learning? Why?
2. How do you spend your free time?
3. Which places do you like to visit in Myanmar? Why?
4. Do you explain about your daily life?
5. What benefits do you get by attending University of computer studies?

### QUESTION V

(20 Marks)

Write an ESSAY on the following topic.

*There is a good deal of evidence that increasing car use is contributing to global warming and having other undesirable effects on people's health and well-being.*

What can be done to discourage people from using their cars. Write at least 250 words.

\*\*\*\*\*END\*\*\*\*\*



**Department of Higher Education**  
**University of Computer Studies, Hinthada**  
**Fifth Year (B.C.Sc./ B.C.Tech.)**  
**Mid-Term Examination**  
**Mathematics of Computing V (CST-501)**  
**March, 2018**

**Answer All Questions.**

**Time Allowed: 3 Hours.**

1. (a) A phone store stocks a particular model computer that can be ordered weekly. Let  $D_1, D_2, \dots$  represent the demand for this phone (the number of units that would be sold if the inventory is not depleted) during the first week, second week, ..., respectively. It is assumed that the  $D_i$  are independent and identically distributed random variable having a Poisson distribution on with a mean of 1. Let  $X_0$  represent the number of phones on hand at the outset,  $X_1$  the number of phones on hand at the end of week 1,  $X_2$  the number of phones on hand at the end of week 2, and so on. Assume that  $X_0 = 3$ . On Saturday night the store places an order that is delivered in the time for the next opening of the store on Monday. The store uses the following ordered policy. If there are number of phones on hand at the end of the week is 0 or 1, two additional phones will take place. The cost is changed as follows:

$$C(X_t) = \begin{cases} 0 & \text{if } X_t = 0 \\ 2 & \text{if } X_t = 1 \\ 8 & \text{if } X_t = 2 \\ 18 & \text{if } X_t = 3 \end{cases}$$

- (i) Find the steady-state probabilities of the state of this Markov chain.  
(ii) Find the long-run expected average storage cost per week.
- (b) A machine is inspected at the end of every hour. It is found to be either working (up) or failed (down). If the machine is found to be up, the probability of its remaining down for the next hour is 0.1. If it is down, the computer is repaired, which may require more than 1 hour. Whenever the machine is down, the probability of its still being up 1 hour later is 0.65.
- (i) Construct the (one-step) transition matrix for this Markov chain.  
(ii) Find the  $\mu_{ij}$  (the expected first passage time from state  $i$  to state  $j$ ) for all  $i$  and  $j$ .
2. (a) Consider the following gambler's ruin problem. A gambler bets \$ 1 on each play of a game. Each time, he has a probability  $\alpha$  of winning and probability  $(1 - \alpha)$  of losing the dollar bet. He will continue to play until he goes broke or nets a fortune of  $T$  dollars. Let  $X_n$  denote the number of dollars possessed by the gambler after the  $n^{\text{th}}$  play of the game.  $\{X_n\}$  is a Markov chain. The gambler starts with  $X_0$  dollars, where  $X_0$  is appositive integer less than  $T$ .
- (i) Construct the (one step) transition matrix of the Markov chain.  
(ii) Find the classes of the Markov chain.  
(iii) Let  $T = 3$  and  $\alpha = 0.7$ . Find  $f_{10}, f_{1T}, f_{20}, f_{2T}$
- (b) The state of a particular continuous time Markov chain is defined as the number of jobs currently at a certain work center where a maximum of two jobs are allowed. Jobs arrive individually. Whenever fewer than three jobs are present, the time until the next arrival has an exponential distribution with mean of  $\frac{1}{2}$  day. Jobs are processed at the work center one at a time and then leave immediately. Processed at the work center one at a time and then leave immediately. Processing times have an exponential distribution with a mean of  $\frac{1}{4}$  day.
- (i) Construct the rate diagram for this Markov chain  
(ii) Write the steady-state equations.  
(iii) Solve these equations for the steady-state probabilities.
3. (a) The jobs to be performed on a particular machine arrive according to a Poisson input process with a mean rate of two per hour. Suppose that the machine breaks down and will require

- 1 hour to be repaired. What is the probability that the number of new jobs that will arrive during this time is (i) 0, (ii) 2, (iii) 5 or more?
- (b) Suppose that a queueing system has two servers, an exponential interarrival time distribution with a mean of 2 hours, and an exponential service-time distribution with a mean of 2 hours for each server. Furthermore, a customer has just arrived at 12:00 noon.
- (i) Suppose that no additional customers arrive before 1:00 pm. Now what is the probability that the next arrival will come between 1:00 and 2:00 pm?
- (ii) What is the probability that the number of arrivals between 1:00 and 2:00 p.m. will be (a) 0, (b) 1, (c) 2 or more?
- (iii) Suppose that both servers are serving customers at 1:00 p.m. What is the probability that neither customer will have service completed (a) before 2:00 pm. (b) before 1:10 pm. (c) before 1:01 pm.?
4. (a) A maintenance person has the job of keeping two machines in working order. The amount of time that a machine works before breaking down has an exponential distribution with a mean of 11 hours. The time then spent by the maintenance person to repair the machine has an exponential distribution with a mean of 8 hours.
- (i) Construct the rate diagram.
- (ii) Develop the balance equations.
- (iii) Solve these equations to find the steady-state probability distribution of the number of machines breaking down.
- (iv) Calculate  $L$ ,  $L_q$ ,  $W$ ,  $W_q$ .
- (v) Determine the proportional of time that the maintenance person is busy.
- (b) The time required by a mechanic to repair a machine has an exponential distribution with a mean of 4 hours. However, a special tool would reduce this mean to 2 hours. If the mechanic repairs a machine in less than 2 hours, he is paid \$100, otherwise he is paid \$80. Determine the mechanic's expected increase in pay per machine repaired if he uses the special tool.
5. (a) The Rustbelt Manufacturing Company will be opening a new box office where customers can come to make ticket purchases in advance for the many entertainment events being held in the area. Simulation is being to analyze whether to has one clerk on duty at the box office. While simulating the beginning of a day at the box office the first customer arrives 5 minutes after it opens and then the inter arrival times for the next four customers (in order) are 3 minutes, 9 minutes, 2 minutes, and 4 minutes, after which there is a long delay until the next customer arrives. The service times for these first five customers (in order) are 8 minutes, 6 minutes, 2 minutes, 4 minutes and 7 minutes.
- (i) For alternative of a single clerk, plot a graph that shows the evolution of customers at the box office over this period.
- (ii) Use this figure to estimate the usual measures of performance  $L$ ,  $L_q$ ,  $W$ ,  $W_q$  and the  $P_n$  for this queueing system.
- (b) (i) Use the mixed congruential method to generate a sequence of five two-digit random integer numbers such that  $x_{n+1} \equiv (61x_n) \pmod{100}$  and  $x_0 = 10$ . Convert these random integer numbers to uniform random numbers.
- (ii) Use four uniform random numbers as instructed (0.010, 0.569, 0.411, 0.665), generate random observations from the following probability distributions. The distribution whose probability density function is

$$f(x) = \begin{cases} \frac{1}{4}(x+1)^3 & \text{if } -1 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

**Department of Higher Education  
University of Computer Studies, Hinthada  
Fifth Year (B.C.Sc./B.C.Tech.)  
Mid-Term Examination  
Distributed System + Advanced Networking (CST-502)  
March, 2018**

**Answer All Questions.**

**Time Allowed: 3 Hours**

**Advanced Networking**

1. Write short notes on **ANY FIVE** of the followings. **(10 marks)**

- (a) IP routers
- (b) Two fundamental observations in network-level interconnection
- (c) IPv4 directed broadcast address
- (d) Sub-netting
- (e) MPLS ingress
- (f) Label swapping
- (g) NAT ( Network Address Translation)
- (h) VPN ( Virtual Private Network)
- (i) Information security
- (j) IPsec

2. Choose **ANY TWO** of the following questions. **(10 marks)**

- (a) Explain advantages of the network-level interconnection.
- (b) What is architecture of internet?
- (c) An ISP leased you the following network.

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You need to create 60-subnetworks from the single network.

- (1) What will be your new subnet mask?
- (2) How many hosts will be supported in each subnet?
- (3) What is the subnet address of the fourth subnet?
- (4) What is the broadcast address of the sixth subnet?
- (d) Router R<sub>1</sub> has an interface named Gigabit Ethernet 0/1, whose MAC address has been set to 5055.4444.3333. This interface has been configured with ipv6 address 2000:1:1:1::/64 eui-64 subcommand. What unicast address will this interface use?

- 3.(a) How can an MPLS label accompany a datagram across a conventional network? **(10 marks)**
- 3.(b) How does a VPN tunnel work? **(10 marks)**
- 3.(c) Which protocol header used in IPsec to handle confidentiality? **(10 marks)**

\*\*\*\*\*END\*\*\*\*\*

**Department of Higher Education**  
**University of Computer Studies, Hinthada**  
**Fifth Year (B.C.Sc.)**  
**Mid-Term Examination**  
**Information Assurance and Security (CS-503)**  
**March, 2018**

**Answer All Questions.**

**Time Allowed: 3 Hours**

1. Choose the answer(s) for the following statements: (15 marks)
- (1) In computer security, computer system assets can be modified only by authorized parties means  
(A) Authenticity (B) Availability (C) Confidentiality (D) Integrity
- (2) Which of the following is the security attack that is used for an illegal attempt to manipulate the people of an organization into divulging the password and confidential information under the pretext of an emergency?  
(A) Password cracking (B) Social engineering (C) Springboard attack (D) Trojan horse
- (3) Which of the following is/are threats for electronic payment systems?  
(A) Computer worms (B) Computer virus (C) Trojan horse (D) All of these
- (4) Which of the following is an explanation of SQL injection?  
(A) It is an attack by sending data containing a malicious script to a website.  
(B) It is an attack where a command for performing a malicious query or operation in the database is entered when there is a problem in a Web application, and the data of the database is modified or acquired without authorization.  
(C) It is an attack where a vulnerability of a commercial DBMS is exploited to search the host database server and cause repeated self-infection in order to cause a rapid increase in Internet traffic.  
(D) It is an attack where a website visitor is made to view a Web page containing an embedded malicious script.
- (5) An attack that an application takes untrusted data and sends it to a web browser without proper validation is called:  
(A) Password cracking (B) Social engineering (C) Cross-site scripting (D) Trojan horse
- (6) Which of the following is a secure communication protocol that provides a hybrid cryptosystem where public key cryptography is used to transfer a shared private key securely to the other side, and private key cryptography is used to encrypt subsequent communications for the remaining session?  
(A) AES (B) RSA (C) SSL/TLS (D) None of these
- (7) Which is the best defense against network sniffing?  
(A) Use of switches (B) Use of wired networks (C) Use of gateway (D) Encryption
- (8) What can a firewall protect against?  
(A) viruses (B) unauthenticated interactive logins from the "outside" world  
(C) fire (D) connecting to and from the "outside" world
- (9) The accounting branch of a large organization requires an application to process expense vouchers. Each voucher must be input by one of many accounting clerks, verified by the clerk's applicable supervisor, then reconciled by an auditor before the reimbursement check is produced. Which access control technique should be built into the application to best serve these requirements?  
(A) Mandatory Access Control (MAC) (B) Password Security  
(C) Role-based Access Control (RBAC) (D) Terminal Access Controller Access System
- (10) Which command is used to get the input from the user?  
(A) read (B) print (C) cat (D) copy
- (11) When you want to sort the numerical data, which command do you use?  
(A) sort (B) sort -n (C) sort -r (D) none of these
- (12) Strong authentication is needed to access highly protected areas. In case of strong authentication the identity of a person is verified by using three factors. Which factor is verified when we must show our access pass?  
(A) something you are (B) something you have (C) something you know (D) none of these



- (13) What is Kerberos?  
 (A) E-mail proxy server. (B) part of PKI  
 (C) Trusted key server system from MIT (D) none of these
- (14) An asset that is needed for optimal operation of the organization but whose loss of availability would not cause major issues to the organization.  
 (A) Personnel asset (B) Restricted asset (C) Unrestricted asset (D) General asset
- (15) Assets that are distinct to an organization.  
 (A) General asset (B) Restricted asset (C) Unrestricted asset (D) Idiosyncratic asset

2. Which statements are *True* or *False*? (15 marks)

- (1) Biometrics is the use of your physiological characteristics – such as your fingerprint, the blood vessels in the iris of your eye, the sound of your voice, or perhaps even your breath – to provide identification. (True/False)
- (2) User name and password should  
 (a) be treated as confidential and protected from unauthorized access, use, or disclosure.  
 (b) not be shared or disclosed  
 (c) not be written down or stored in the file.  
 (d) not be communicated via e-mail
- (3) You have received a suspicious e-mail to your Government e-mail account, you should  
 (a) do not respond to the email.  
 (b) do not click on any links or attachments in the e-mail.  
 (c) report your suspicion by calling the service desk  
 (d) do not forward the e-mail to anyone else.
- (4) A Dos attack is designed to flood a system with so many requests that the target system eventually stops responding or crashes. (True/False)
- (5) A hash that is created from a set of data can be reversed. (True/ False)
- (6) Attacks that can be written and deployed in a single day are known as zero day attacks.(True/False)
- (7) Like a virus, a worm needs the user to perform an action such as starting a program or opening an e-mail attachment to start the infection. (True/False)
- (8) Passwords provide strong protection. (True/False)
- (9) SQL injection attacks target Web servers by injecting SQL commands into the HTML code, thus causing the Web site to crash. (True/False)

3. Answer **ANY FIVE** of the following questions. (25 marks)

- What is confidentiality? Integrity? And availability?
- What are the recommendations for creating good passwords?
- What are personnel assets? Information assets? And Legal assets?
- What is a threat model?
- How is public-key cryptography used to provide digital signatures?
- What is identity management?
- What is IDS/IPS? Describe two type of intrusion detection systems.

4. (a) **Case study One**

*In the University, there is an exam management system for administrators, instructors and student providing the online access through the local network. Administrators have accessed to the exam information database that stored the information of questions, markings, pay marks, result marks and student answers. Instructors have access to the student database to store the student tutorial marks, assignment marks and to give marks for the student's answer. Students have access the exam page and can submit the answer of exam to examine. To authenticate the system, the system identifies the password system. For the authenticate users, the users have the access right for their ranks/roles.*

Consider the following questions based on above *case study one*.

- (1) What assets are existed in the university? (2 marks)
- (2) According to your suggested assets, classify asset types, asset sensitivity and criticality for each. (4 marks)



- (3) Suggest possible vulnerabilities can be occurred with the exam management system. (2 marks)
- (4) Which access control type is used in exam management system? (2 marks)
- (5) When there is a threat occurred, identify the affected characteristics to your suggested assets. (2 marks)
- (6) What protection steps can be made to ensure the security of the university's system? (2 marks)
- (7) To secure the server system, suggest what kinds of IDS/IPS are have to be create? (2 marks)
- (8) List minimum five threats that can be face with the university's system? (2 marks)
- (9) List possible threat agents (including internal, external, or partner)? (2 marks)

4. (b) **Case study Two**

**OFFENSIVE CYBER EFFECTS OPERATIONS (OCEO)**

*Among the documents that Edward Snowden, the contractor working at the NSA, released after quitting the agency was Presidential Policy Directive 20 (PPD20), issued on October 2012. Among other things, 18-page top-secret memo defined the role of "offensive cyber effects operations" (OCEO). OCEO was defined as "Operations and related programs or activities other than network defense, cyber collection, or DCEO – conducted by or on behalf of the United States Government, in or through cyberspace, that are intended to enable or produce cyber effects outside United States Government networks."The description of OCEO in PPD 20 states the following:*

*OCEO can offer unique and unconventional capabilities to advance US national objectives around the world with little or no warning to the adversary or target and with potential effects ranging from subtle to severely damaging. The development and sustainment of OCEO capabilities, however, may require considerable time and effort if access and tools for a specific target do not already exist.*

*The United States Government shall identify potential targets of national importance where OCEO can offer a favorable balance of effectiveness and risk as compared with other instruments of national power, establish and maintain OCEO capabilities integrated as appropriate with other US offensive capabilities, and execute those capabilities in a manner consistent with the provisions of this directive. You are entering into the professional world operating in this environment*

Consider the following questions based on above *case study two*..

- (1) In plain terms, what is OCEO? (1 mark)
- (2) What are some activities that may constitute OCEO? (2 marks)
- (3) What are some likely repercussions to information security professionals working within the United States (and probably outside the United States), now that everyone is aware of PPD20? (3 marks)
- (4) What can be offered by the OCEO ? (2 marks)
- (5) OCEO is developed under which organization and for what reason? (2 marks)

4. (c) **Case study Three**

**SCRIPT SECURITY**

*Scripting is a great utility. But we would be remiss in a book on information security if we did not alert you to important security concerns with scripts. Apple's developer pages have information on shell script security. Highlights include the following:*

*\*If the full (absolute) paths to commands are not specified, the script may end up running malicious code that has the same name as a command invoked from the script. \*If user input is accepted without verification, a knowledgeable user can exploit the script's privileges. Therefore, as far as possible, user input should be used only if matches a set of allowed values. \*Scripts should not have to determine whether a user has the required privileges to execute a script. The user invoking the script can modify environment variables to defeat such checks.*

Consider the following questions based on above *case study three*.

- (1) If scripts are primarily for use by expert system administrators, why should you care about security in the script code? (4 marks)
- (2) Why is it dangerous to execute scripts as the root user? (4 marks)
- (3) Name the attack that can be exploit in the script. (2 marks)
- (4) Explain the attack that you have name above. (5 marks)

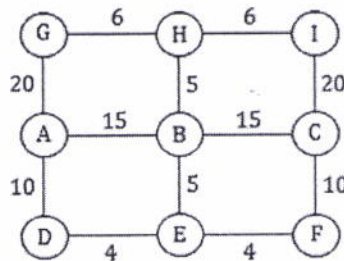
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**Department of Higher Education**  
**University of Computer Studies, Hinthada**  
**Fifth Year (B.C.Sc.)**  
**Mid Term Examination**  
**Computing Applied Algorithms (CS-504)**  
**March, 2018**

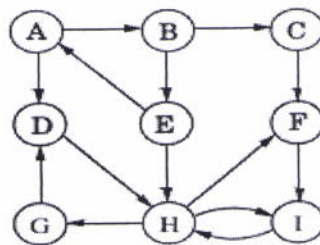
**Answer All Questions.**

**Time Allowed: 3 Hours**

1. (a) Answer the followings: **(15 marks)**
- (i) Let  $G = (V, E)$  be a connected, undirected graph, and let  $S = (V, T)$  be a depth-first spanning tree for  $G$ . Explain the articulation point of  $G$ . (3 marks)
  - (ii) Explain transitive closure of a directed graph. And give an example problem which is closely related to finding the transitive closure of a graph? (4 marks)
  - (iii) Explain Computational Step and Routing Step. (3 marks)
  - (iv) Discuss the criteria to evaluate parallel algorithm. (5 marks)
1. (b) (i) Draw what a binary search tree would look like if the following values were added to an initially empty tree in the following order:  
 "KIA, TOYOTA, CHEVROLET, BMW, MERCEDES, ROLLS-ROYCE, NISSAN, CADILLAC, JEEP" **(5 marks)**
- (ii) Find the optimal binary search tree for  $p, q, r, s$  with  $q_0=0.125, q_1=0.1875, q_2=q_3=q_4=0.0625$ , and  $p_1=0.25, p_2=0.125, p_3=p_4=0.0625$ . **(10 marks)**
2. (a) Find the minimum-cost spanning tree for the following graph. **(10 marks)**



2. (b) Find the strongly connected components for the following directed graph. **(10 marks)**



2. (c) Find the length of the shortest path between each pair of vertices of the directed graph with the following weight matrix. **(10 marks)**

	A	B	C	D	E	F
A	0	3	5	1	$\alpha$	$\alpha$
B	3	0	$\alpha$	$\alpha$	9	$\alpha$
C	5	$\alpha$	0	7	7	1
D	1	$\alpha$	7	0	$\alpha$	4
E	$\alpha$	9	7	$\alpha$	0	$\alpha$
F	$\alpha$	$\alpha$	1	4	$\alpha$	0

3. (a) Merge the following two sequences by using CREW MERGE algorithm with THREE processors. (10 marks)

$A = \{8, 9, 10, 14, 17, 18, 19, 21, 23\}$ ,  $B = \{6, 11, 12, 13, 15, 16, 20, 22, 24\}$

3. (b) Given the two sequences  $A = \{G, H, I, J, K, L, M, N, O\}$  and  $B = \{A, B, C, D, E, F, P, Q, R, S\}$ . Find the median pair and how many running time are required. (10 marks)

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procedure TWO-SEQUENCE MEDIAN (A, B, x, y)
Step1: (1.1)  $low_A \leftarrow 1$ 
        (1.2)  $low_B \leftarrow 1$ 
        (1.3)  $high_A \leftarrow r$ 
        (1.4)  $high_B \leftarrow s$ 
        (1.5)  $n_A \leftarrow r$ 
        (1.6)  $n_B \leftarrow s$ 
Step2: while  $n_A > 1$  and  $n_B > 1$  do
        (2.1)  $u \leftarrow low_A + \lceil (high_A - low_A - 1) / 2 \rceil$ 
        (2.2)  $v \leftarrow low_B + \lceil (high_B - low_B - 1) / 2 \rceil$ 
        (2.3)  $w \leftarrow \min(\lfloor n_A / 2 \rfloor, \lfloor n_B / 2 \rfloor)$ 
        (2.4)  $n_A \leftarrow n_A - w$ 
        (2.5)  $n_B \leftarrow n_B - w$ 
        (2.6) if  $a_u \geq b_v$ 
            then (i)  $high_A \leftarrow high_A - w$ 
                 (ii)  $low_B \leftarrow low_B + w$ 
            else (i)  $low_A \leftarrow low_A + w$ 
                 (ii)  $high_B \leftarrow high_B - w$ 
            end if
        end while.
Step3: Return as x and y the indices of the pair from  $\{a_{u-1}, a_u, a_{u+1}\} \times \{b_{v-1}, b_v, b_{v+1}\}$ 
        satisfying properties 1-3 of a median pair.

```

4. (a) Sort the following sequence by using EREW SORT algorithm with five processors. (10 marks)  
 $S = \{5, 19, 12, 16, 18, 2, 10, 13, 17, 4, 7, 18, 18, 11, 3, 17, 20, 19, 14, 8, 5, 17, 1, 11, 15, 10, 6\}$

4. (b) Sort the following sequence with 4 processors by using CREW SORT algorithm. (10 marks)  
 $S = \{5, 11, 8, 13, 18, 4, 15, 9, 17, 6, 14, 10, 12, 7, 16, 19\}$

\*\*\*\*\*END\*\*\*\*\*

**Department of Higher Education**  
**University of Computer Studies, Hinthada**  
**Fifth Year (B.C.Sc.)**  
**Mid Term Examination**  
**Web Engineering (CS 505)**  
**March, 2018**

**Answer All Questions.**

**Time Allowed: 3 Hours**

1. Choose the correct answer(s) for the following statements. (20 marks)
- 1) Which of the following statements differentiates WebApps from conventional software:  
(A) performance can be a critical aspect of the application    (B) load is unpredictable  
(C) immediacy is often a primary goal    (D) all of the above
  - 2) You're about to embark on a WebApp development project. How should you begin:  
(A) sketch out the design of the home page and build a prototype that you think will meet user's needs  
(B) collect all of the content that you think will be needed  
(C) talk with potential users in an effort to understand what they want how they'll interact with the WebApp  
(D) none of the above
  - 3) Which of the following is not a recommended development best practice:  
(A) Take the time to understand business needs and product objectives, even if the details of the WebApp are vague  
(B) Minimize opportunities for the client to suggest changes.  
(C) Develop a project plan, even if it's very brief.    (D) Don't reinvent when you can reuse.
  - 4) Which of the following benefits are not provided by use cases?  
(A) provide the detail necessary for effective planning and modeling activities  
(B) help the developer to understand how users perceive their interaction with the WebApp  
(C) provide sufficient detail to enable construction of complex WebApp functionality  
(D) help to compartmentalize Web engineering work because they can be organized into WebApp increments
  - 5) A pair walkthrough is a quality assurance approach that requires  
(A) a pair of independent developers to walk through a WebE work product  
(B) a pair of users to walk through to walk through a WebE work product  
(C) a pair of marketing managers to walk through a WebE work product  
(D) none of the above
  - 6) The "inputs" to the planning activity include:  
(A) information gathered during the communication activity  
(B) the increment definitions as they have been defined  
(C) the structure of the WebE team and the likely number of people doing the work  
(D) all of the above
  - 7) Which of the following is not a desired generic modeling capability?  
(A) Ability to model business domain concepts.    (B) Ability to link information with functionality.  
(C) Ability to link business models with the technical architecture.    (D) All of the above are desired capabilities.
  - 8) One of the outputs of analysis modeling is a \_\_\_\_\_.  
(A) content model    (B) stakeholder model    (C) interface design model    (D) user guide



- 9) Which of the following is not a design goal for WebApps:  
 (A) consistency (B) navigability (C) complexity (D) identity
- 10) Unit-level testing will typically be carried out on the:  
 (A) development server (B) test server (C) staging server (D) none of the above
- 11) Which of the following is not a recommended coding principle:  
 (A) Write code that is self-documenting.  
 (B) Constrain your algorithms by following structured programming practices.  
 (C) Keep as much code in the client to reduce the load on the server  
 (D) Understand the functional architecture and create interfaces that are consistent with it.
- 12) Which server(s) should typically have an identical configuration and environment to the production server?  
 (A) development, test, and staging servers (B) test and staging servers  
 (C) staging server (D) test server
- 13) It is reasonable to state that the communication activity is iterative in nature.  
 (A) true (B) false
- 14) Since changes will only be requested after the first WebApp increment is delivered, it's recommended that you delay planning your approach to change management until work on second increment commences.  
 (A) true (B) false
- 15) In order to plan effectively, a WebE team must understand the scope of the project.  
 (A) true (B) false
- 16) The usefulness of a WebE model can only be judged by considering what the model is trying to help you understand.  
 (A) true (B) false
- 17) A UML use case diagram allows you to represent an individual use case in great detail.  
 (A) true (B) false
- 18) In the context of the design of WebApps, there is really no difference between logical and physical design.  
 (A) true (B) false
- 19) A design pyramid can be used to depict the design tasks (elements) that occur as a complete design model is created.  
 (A) true (B) false
- 20) The conceptual architecture provides an overall structure for the WebApp design, and the technical architecture shows how this can be mapped into specific technical components.  
 (A) true (B) false

2. The WebE Process framework involves numbers of activities and tasks. Define activity or tasks for each question. (20 marks)

- (a) State two of the project needs and scopes that are defined during *Formulating* Session.
- (b) State two tasks that are performed during an *Elicitation* Session.
- (c) During *Negotiation* what things are discussed with stakeholders?
- (d) State how do the WebE teams *self-organizing*.
- (e) *Risk management* focuses on understanding and managing the problems that are raised during the project. State two typical risks.
- (f) State two Quality Assurance Mechanisms the team can use.
- (g) State two main actions done in the modeling activity.

- (h) The Web Application Architecture Framework (WAAF) contains two dimensions; *Row* and *Columns*. What do those two dimensions represent for the modeling framework in the WebE process? Define them.
- (i) State two outputs from the analysis modeling.
- (j) Stat two WebApp design qualities from the five major quality attributes.

3. Write short notes on **Any FIVE** of the followings. (20 marks)

- (a) What are WebApp Attributes?
- (b) Define WebApp Types / Categories.
- (c) What Are the Characteristics of a Good Team Leader?
- (d) Many problems can arise during a project development, on what problems the risk management should focuses on?
- (e) What quality that is more visible to end users for a WebApp design?
- (f) List the WebApp design pyramid for design actions.
- (g) What Is *Refactoring*? How Should It Be Applied in WebApps?
- (h) Define **any four** of the 12 agility principles to adapt the WebE framework.

4. Briefly explain a generic framework for web engineering. (10 marks)

5. Based-on the following conversation, answer the questions. (15 marks)

<b>Refining the WebE Process for Each WebApp Increment</b>	
<p><b>The scene:</b> Meeting room for the Web engineering group as work on the first increment—an informational WebApp for <b>SafeHome</b>—ends</p> <p><b>The players:</b> Technical manager, WebE team members</p> <p><b>The conversation:</b></p> <p><b>Technical manager (to the team):</b> Looks like we'll get the first increment online on Wednesday.</p> <p><b>Team member 2:</b> It was a piece of cake. But the next increment looks a bit more complex and the ones after that . . .</p> <p><b>Team member 1:</b> There's something I don't understand. Getting the requirements for the first increment was easy—simple conversation and then accessing existing content. But the other stuff is more complicated, and we don't have the requirements yet.</p> <p><b>Team member 3:</b> True. We have to begin work on Thursday, and there's a lot that's unclear.</p>	<p><b>Technical manager:</b> That's why we begin the next increment with communication, again.</p> <p><b>Team member 1:</b> But what's the process for the communication activity? For the first increment it was nothing but a quick conversation.</p> <p><b>Technical manager:</b> Like we decided. We tune the process—and that means the communication activity as well as others—to the increment at hand. This time we'll have to be a bit more formal and define specific communication tasks.</p> <p><b>Team member 2:</b> And we'll use those for every remaining increment?</p> <p><b>Technical manager:</b> Nope, every time we begin a new increment, we'll look at its complexity and decide on the "task set" that seems appropriate.</p> <p><b>Team member 3 (smiling):</b> Agile and adaptable.</p> <p><b>Technical manager:</b> That's us!</p>

- (1) The WebE process must be **agile and adaptable**, but it must also be *incremental*. **Why incremental?** (3 marks)
- (2) Why should we begin from the communication activity again at the start of new increment process? (2 marks)
- (3) What tasks should you gets started in the communication activity? (5 marks)
- (4) What Techniques can you use for communication? (3 marks)
- (5) Who should you communicate with? Who are they? (2 marks)

6. Use the following use case and answer the questions.

(15 marks)

- **Example use case:** *Access camera surveillance via the Internet.*
- **Actor:** HomeOwner
- **Narrative:**

If I'm at a remote location, I can use any PC with appropriate browser software to log on to the SafeHomeAssured.com website. I enter my user ID and two levels of passwords, and once I'm validated, I have access to all functionality for my installed SafeHome system. To access a specific camera view, I select "surveillance" from the major function buttons displayed. I then select "pick a camera," and the floor plan of the house is displayed. I then select the camera that I'm interested in. Alternatively, I can look at thumbnail snapshots from all cameras simultaneously by selecting "all cameras" as my viewing choice. Once I choose a camera, I select "view" and a camera view appears in a viewing window that is identified by the camera ID. If I want to switch cameras, I select "pick a camera" and the original viewing window disappears and the floor plan of the house is displayed again. I then select the camera that I'm interested in. A new viewing window appears.

- (1) For analysis action of above use case, what can you examine about the requirements and what are the missing information for requirement?
- (2) Build UML class diagram of the content model for given use case "*Access camera surveillance via the Internet*".
- (3) Build UML sequence diagram for given use case, "*Access camera surveillance via the Internet*".

\*\*\*\*\*END\*\*\*\*\*